2003

The MOVES Degree and the MOVES Research Program

Zyda, Michael

6 November 2003: "The MOVES Degree and the MOVES Research Program," at the Navy TIM Conference on Expanding Human Expertise in Modeling and Simulation Conference, at the

The MOVES Degree Program & the MOVES Institute

Michael Zyda, Director
zyda@movesinstitute.org

The MOVES Curriculum

A little history ...

MOVES Naval Postgraduate School

- MOVES began in March, 1996 with the M.S. degree program
- The MOVES Ph.D. was approved in March, 1999
- Intended to be part Computer Science and part Operations Analysis

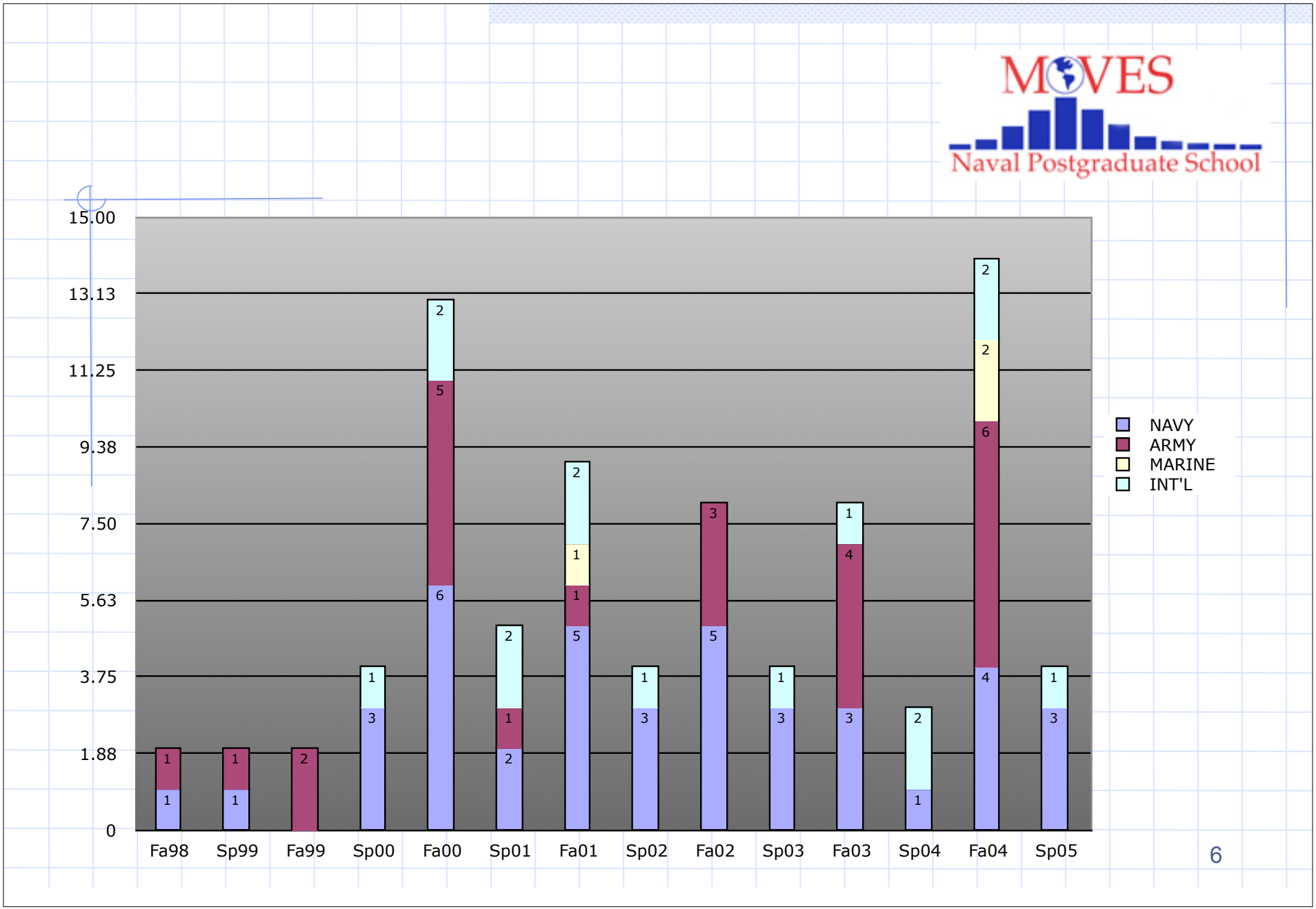
Program objectives

MOVES Naval Postgraduate School

- Our students go on to manage M&S systems, not build them
- We believe this means that they have to know how to architect next-generation M&S systems
- Q: How can someone manage and/or architect a system who does not know the fundamentals of what is being built?
- A: They can't.

Where do our students come from?

- Navy subspecialty (6202/xx99 P-code) in modeling and simulation,
- Marine Corps' modeling and simulation subspecialty (MOS 9625),
- US Army's Simulation Operations functional area (FA-57), and
- International (Turkey, Greece, Singapore, Germany)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Educational Skill Requirements

Maritime Strategic and Joint Planning
Software Development
Software Technology
Computer Systems Design
Computer Architecture
Analytical Skills
Data Analysis and Stochastic Models
Virtual Environments and Computer-Human Interaction
Problem Solving and Real World Applicability

The MOVES Core

Refresher (Summer)	CSR-101 (2-1) Refresher for Lab Systems	MA-1042 (2-0) Matrix Algebra‡	MA-1113 (5-2) Single Variable Calculus[2]	MA-1025 (4-0) Intro to Finite Math	
Quarter 1 (Fall)	**CS-2900 (4-2)** Introduction to Objects & Programming	**CS-3010 (4-2)** Computer Systems Principles	**OS-3111 (4-1)** Probability & Statistics[1,3]	**OA-3401 (3-1)** Human Factors in System Design	**MV-4921 (2-0)** Introduction to MOVES†
Quarter 2 (Winter)	**CS-3900 (4-2)** Intro to Data Structures & Intermediate Programming	**MV-4204 (3-2)** Computer Graphics Modeling	**OS-3112 (4-1)** Statistics & Data Analysis[1,3]	**MV-4002 (4-1)** Simulation and Training[4]	**MV-4922 (2-0)** Introduction to Virtual Environment Technology†
Quarter 3 (Spring)	**CS-3771 (4-2)** C++ as a Second Language	**CS-3502 (4-2)** Computer Comms & Networks	**OS-3113 (4-1)** Advanced Data Analysis[1,3]	**OS-3307 (4-0)** Stochastic Models & Military Applications[1,4]	**MV-4923 (2-0)** Current Research in MOVES†
Quarter 4 (Summer)	**MV-3202 (3-2)** Computer Graphics Programming	**CS-3310 (4-1)** Artificial Intelligence	**OA-3302 (4-0)** System Simulation I	**OA/MV4655 (4-0)** Intro to Combat Modeling	**MV-4924 (2-0)** Research Seminar in MOVES†

MOVES, 2nd Year

Quarter 5 (Fall)	Block Requirement	Block Requirement	Block Requirement	Block Requirement	**MV-4924 (2-0)** Research Seminar in MOVES
Quarter 6 (Winter)	Block Requirement	Block Requirement	Block Requirement	Block Requirement	**MV-4924 (2-0)** Research Seminar in MOVES
Quarter 7 (Spring)	**MV-0810** Thesis Research	Block Requirement	Block Requirement	Block Requirement	**OA-4658 (2-0)** Survey of Combat Models[6]
Quarter 8 (Summer)	**MV-0810** Thesis Research	**MV-0810** Thesis Research	**MV-4460 (4-0)** Management of M&S Development[5]	Block Requirement	**OA-4658 (2-0)** Survey of Combat Models[6]

MOVES Blocks

Pick three

- Combat Modeling
- Networked Visual Simulation
- Web-Based Simulation
- Agents and Cognitive Modeling
- Training Systems
- Human Factors
- Physically Based Modeling
- Optimization
- Management and Acquisition

Blocks ...

BL1. Combat Modeling
Coordinator: S. MANAGO
OA4655 Introduction to Combat Modeling (core)
OA4656 Advanced Combat Models
OA4604 Wargaming
OA4602 Joint Campaign Analysis

BL2. Networked Visual Simulation
Coordinator: J. SULLIVAN
MV4202 Computer Graphics Programming (core)
MV3500 Inter-network Communication for Simulation
MV4470 Image Synthesis
MV4471 Computer Animation

BL3. Web-Based Simulation
Coordinator: D. BRUTZMAN
MV4204 Computer Graphics Modeling (core)
MV4205 Advanced Computer Graphics Modeling
MV3250 Introduction to XML Programming
MV4250 Advanced XML Design

Blocks ...

BL4. Agents & Cognitive Modeling
Coordinator: J. HILES
CS3310 Artificial Intelligence (core)
MV4015 Agent-Based Autonomous Behavior
MV4025 Cognitive and Behavioral Models for Simulations
MV4100 Cognitive Engineering

BL5. Training Systems
Coordinator: R. DARKEN
MV4002 Simulation and Training (core)
OA4403 Team Performance and Decision Making
OA4402 Skilled Operator Performance
MN4115 Training Foundations & Management

BL6. Human Factors
Coordinator: N. MILLER
OA3401 Human Factors in System Design (core)
MV4001 Human Factors of Virtual Environments
OA3402 Human Performance Measurement
OA4401 Sensation, Perception, and Cognition

Blocks ...

BL7. Physically Based Modeling
Coordinator: C. DARKEN
MV3472 Introduction to Physically Based Modeling
MV4472 Advanced Physically Based Modeling
MV4471 Computer Animation

BL8. Optimization
Coordinator: K. Wood
OA3201 Linear Programming
OA4201 Nonlinear Programming
OA4202 Networks

BL9. Management & Acquisition†
MN3331 Principles of Systems Acquisition and Program Management
MN3105 Organization & Management
Pick one from:
MN4602 Test and Evaluation Management
MN3309 Acquisition of Weapon Systems Software
MN3384 Principles of Acquisition Production and Quality Management
MN4310 Logistics Engineering
MN3371 Contracts Management and Administration
MN3155 Financial Management for Acquisition Managers

The MOVES Institute

Mission

MOVES Naval Postgraduate School

Research, application and education in the grand challenges of modeling, virtual environments and simulation.

- 3D Visual Simulation & Networked Virtual Environments
- Computer-Generated Autonomy & Computational Cognition
- Human Performance Engineering
- Immersive Technologies
- Defense and Entertainment Collaboration
- Combat Modeling & Analysis
- Unconventional Modeling

Organizational Structure

Director

- Michael Zyda

Technical Directorate

- John Hiles - Computer-Generated Autonomy & Computational Cognition
- Don Brutzman - 3D Visual Simulation & Networked Virtual Environments
- Rudy Darken - Human Performance Engineering
- LtCol Saverio Manago, USA - Combat Modeling & Analysis
- Alex Callahan - Combat Modeling & Analysis
- LtCol Tom Cioppa, USA - TRAC Monterey
- Ted Lewis - High Performance Computing & Software Engineering
- Alex Mayberry, Creative Director

Advisory Board

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Advisory Board provides guidance on funding for research and products.

- VADM Richard Mayo, USN - NETWARCOM
- RADM Thomas Zelibor, USN - N61
- John McLaurin, Deputy Assistant Secretary of Army for M&RA
- RADM Lee Kollmorgen, USN (ret)
- CAPT Dennis McBride, USN (ret), PhD - President, Potomac Institute
- Dr. Harold Hawkins, ONR
- COL Mike Finnern, USAF - Director, DMSO
- Dell Lunceford - Director, AMSO
- COL Casey Wardynski, Director, Office of Economic & Manpower Assessment
- Gilman Louie, In-Q-Tel
- Dr. Mike Bailey - Technical Director, USMC Training & Education Command
- Michael Kapp - Founder & President Time Warner Special Projects (ret)
- Stephen Moore,Technical Director J7, JFCOM

Advisory Board cont.

- Dr. Mary Fischer, Air Force Agency for Modeling & Simulation
- Dr. Phil Barry, DMSO OOTW Technical Lead
- CDR Henry Brus, USN - Director, Navy Modeling & Simulation Management Office, N61M
- Jim Weatherly - Deputy Director, Navy Modeling & Simulation Management Office, N61M
- LCDR Dylan Schmorrow, USN – ONR VIRTE Program Manager & DARPA Program Manager
- Dr. Bowen Loftin - Old Dominion University, Director Virginia Modeling & Simulation Center
- Dr. Mark Pullen, George Mason University
- Dr. Randy Shumaker - Director, UCF Institute for Simulation & Training
- COL Jack Thorpe, USAF (ret), PhD
- RADM David Bill, USN (ret), NPS Foundation

Directions

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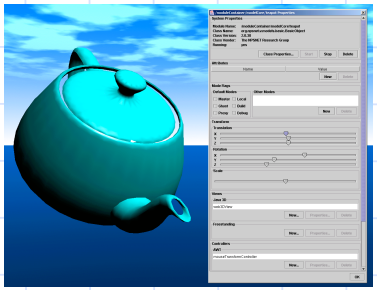
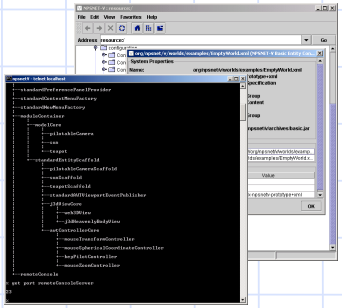
3D Visual Simulation & Networked Virtual Environments

In networked virtual environments, we are architecting the technology that allows us to build large-scale, dynamically extensible virtual environments, virtual environments that are semantically interoperable and always on.

npsnetV





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NPSNET-V / Extensible Run-Time Infrastructure (XRTI)
Sponsor – N6
Researchers – Andrzej Kapolka, Don McGregor
Goals – Create platform for building, browsing, publishing, and hosting component-based shared virtual worlds. Design and implement open-source HLA RTI with enhanced ease-of-use, standardizable message protocol, and ability to dynamically extend federation object models

Deliverables

Designed and implemented NPSNET-V component framework and browser platform. All software open-source, available through web site: http://www.npsnet.org/~npsnet/v/

Papers published at CVE 2002, ConTEL 2003

Paper submitted to Presence

Talks given at MOVES Open House 2001, 2002

Demonstrations given at MOVES Open House 2002, I/ITSEC 2002

Student Research:

- LT James Harney USN: Anti-Terrorism/Force Protection
- LCDR Ernesto Salles, USN: Net-VE Security
- LTJG Ekrem Serin, Turkish Navy: Cross-Format Schema Protocol

Milestones

August 2002 – Initial concept for XRTI presented at XMSF workshop; plan for NPSNET-V browser platform introduced at MOVES Open House

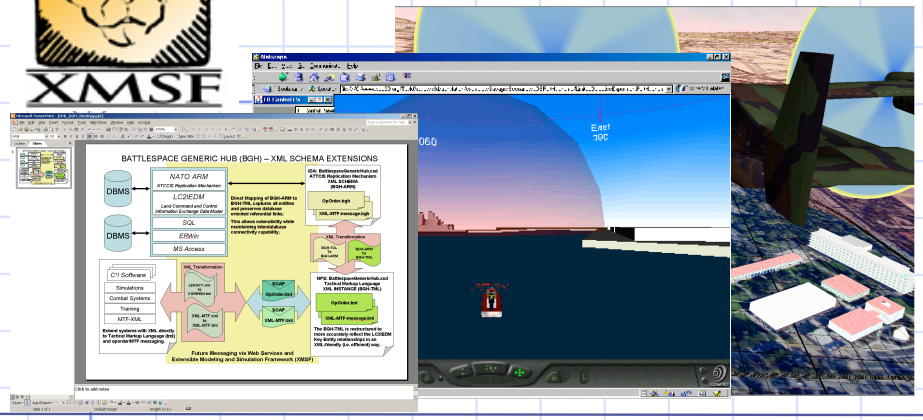
September 2002 – Two papers on NPSNET-V presented at ACM Collaborative Virtual Environments Workshop

December 2002 – NPSNET-V demonstrated at I/ITSEC; NPSNET-V 2.0 published on SourceForge

May 2003 – Paper on NPSNET-V browser platform submitted to Presence

June 2003 – Paper on NPSNET-V networking considerations presented at ConTEL

August 2003 – NPSNET-V browser platform and XRTI to be presented at MOVES Open House



Extensible Modeling and Simulation Framework (XMSF)
Sponsors – DMSO, DTRA
PIs – Don Brutzman, Curt Blais
Goal – Define a composable set of standards, profiles and recommended practices for web-based Modeling & Simulation (M&S), enabling simulations to interact directly and scalably over a highly distributed network, achieved through compatibility between a web framework and networking technologies.

Deliverables

Conducted a series of technical and management workshops to identify key issues facing exploitation of Web-based standards and practices for military M&S
Published technical papers at I/ITSEC 2002, Spring SIW 2003, Euro SIW 2003
Technical demonstrations and presentations at I/ITSEC 2002 and 2003 (planned)
Student Research:

- LT James Harney USN, Anti-Terrorism/Force Protection
- LTjg Ekrem Serin, Turkish Navy, Cross-Format Schema Protocol
- Maj Khaled Mnif, Tunisian Army, Simulation Data Interchange
- Capt Claude Hutton USMC, Operations Planning Visualizations
- Capt James Neushul USMC, Terrain Data Server

Corporate/Academic Partners

Katherine Morse, SAIC
Mark Pullen, GMU
Andreas Tolk, ODU/VMASC

Milestones

August 2002 – Technical Challenges Workshop
September 2002 – Strategic Opportunities Workshop
December 2002 – briefs/exemplar demos at I/ITSEC 2002
February 2003 – Early Adopters Workshop
May 2003 – VMASC/JFCOM Workshop
July 2003 – Demonstration during JFCOM exercise
August 2003 – XMSF Coordination Workshop
October 2003 – Web-Enabled M&S Workshop
December 2003 – briefs/exemplar demos at I/ITSEC 2003

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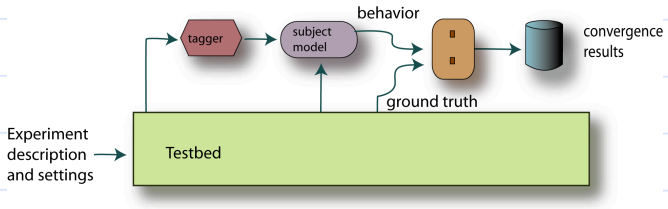
Computer Generated Autonomy

We are building software for creating mental blends based on situation, goals, and subject generic spaces using the MOVES-developed Connector-based Multi-Agent System (CMAS) architecture.

Overview:



Project Iago

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Deliverables:

- Architecture for application of cognitive blending to Anticipation Problem
- First Multiagent-based production of Cognitive Blending (SIMPLEX)
- Subject Matter Expert tagging of input events suitable to drive IAGO model

Publication:

White Paper: Iago

Student Involvement

Curt Blais

Zack Staples

Rob Michaels

Project Iago - Autonomous Software for Computational Cognition

Sponsors: CDTEMS

PI's: John Hiles, Curt Blais, Ted Lewis

Goal: Demonstrate that a Connector-based Multiagent system could computationally produce analogs of the Cognitive Operations described by Cognitive Blending Theory and apply the resulting cognitive constructions to modeling the planning and behavior of a subject individual.

Project Iago Overview

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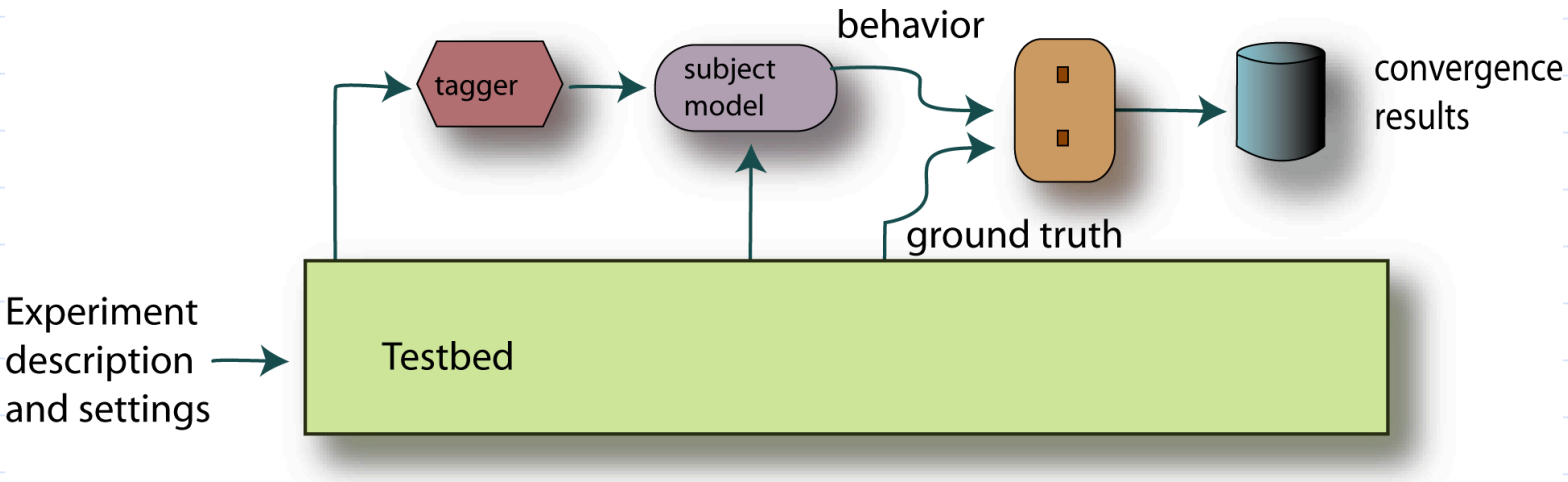
Overview:



Situation Understanding for Autonomous Agents
Sponsors – N6M, TRAC MRY
PI – Chris Darken
Goal – To build autonomous agents for virtual environments that understand the situations they find themselves in to an unprecedented degree, and leveraging this into the ability to understand natural language. Acquisition of the large amount of knowledge needed for such systems makes the development and thorough-going application of machine learning techniques a practical necessity. Distinctive aspects include the modeling of elements of subconscious cognition such as associative memory, perception, and motor processing and rigorous characterization of the developed techniques.

Research Partners

Jack Jackson, TRAC MRY

Student Research

- LTC Rene Burgess, USA, Avenue of Approach and Deployment Estimation
- MAJ David Morgan, USA, Cover and Concealment Algorithms
- LTJG Fahrettin Akbori, Turkish Navy, ASW Trainer
- Christian Buhl, AGP, Waypoint-Based Hunting and Hiding

Milestones and Deliverables

October 2002 – Presentation: A Simple Virtual Machine for Multi-Agent Systems Based on Cellular Coordination Mechanisms

September 2003 – Technical Report: Context-Driven Architecture for Natural Language Processing

September 2003 – Project Summary: Natural Decision Making Model for Information Fusion

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Human Performance Engineering

In human performance engineering, the work is to build deployable simulators for the Navy & Marines Corps and evaluate their utility for training.

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Virtual Technologies and Environments (VIRTE)
Sponsor - ONR 342
PIs - Rudy Darken, CDR Joe Sullivan, LCDR Russ Shilling
Goal - Deployable Training for Navy and Marine Corps

Deliverables

ChrAVE – (Chroma-Keyed Augmented Virtual Environment) Imbedded trainer/flight rehearsal tool designed to practice and maintain pilot and navigation skills while on deployment.

Artillery Forward Observer (FO) Trainer/Simulator – Designed to maintain FO skills while on deployment.

-Runs on a PC in a distributed network

Close Quarter Battle (CQB) Trainer/Simulator – Allows users to rehearse building clearing drills while on deployment via Head Mounted Display and a tracked weapon in a networked virtual environment.

Milestones

Spring 2002. First prototype VE helicopter simulator completed

Summer 2002. Full cognitive task analysis of close-quarters combat completed

Summer 2002. HLA module completed

Fall 2002. HLA integration completed, JSAF compliant

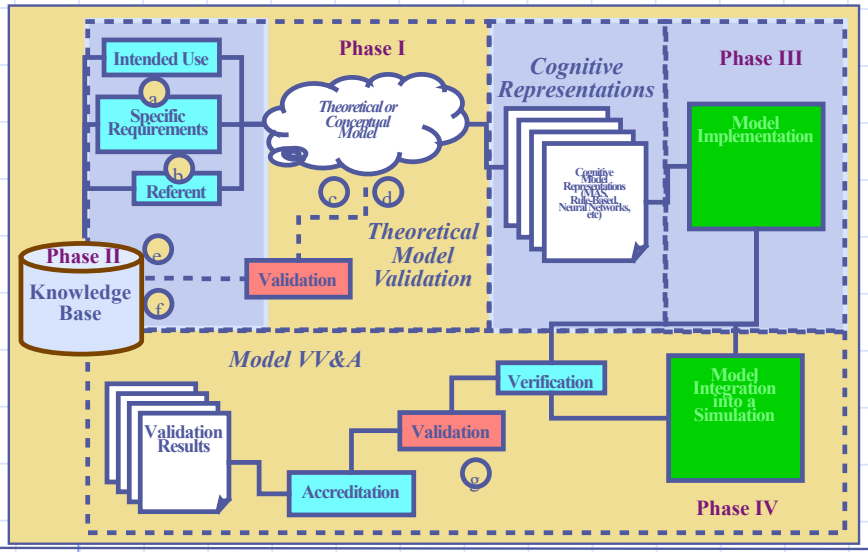
Fall 2002. First combined arms tasks supported.

Spring 2003. Field testing with Marine Corps squadron.

Spring 2003. Field testing with CAX at 29 Palms

Summer 2003. Integration with other VIRTE simulators (AAAV & LCAC)

VV&A Process for Behavioral Models



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Validation and Evaluation of Cognitive Models for Combat Simulations

Sponsors – CNO

PIs – Dr Rudy Darken, MAJ Simon R. Goerger

Goal – Provide procedures for the DoD Modeling and Simulation (M&S) community to validate or evaluate cognitive model implementations for future use in legacy and emergent combat simulations.

Deliverables

Research human performance evaluation and cognitive task analysis techniques to incorporate them into the a series of procedures for validating human performance representation (HBR) models to reduce the bias of subject matter experts (SMEs). Will conduct a series of HBR model validation studies to identify SME biases and identify procedures to reduce these bias. Final products will be:

- Dissertation on the validation of HBR models
- Technical report to be submitted to DMSO and subordinate agencies describing the issues behind and means of reducing SME bias during the validation of HBR models

Corporate/Academic Partners

TRAC – for use of COMBAT^{XXI}, entity level analytical model

Natick Soldier Center – use of human performance data

Milestones

October 2002 – Foundation '02; Validation Workshop

December 2002 – Dissertation proposal

June 2003 – MORSS presentation

July 2003 – SCSC '03 Validation Working Group presentation

July 2003 – Pilot studies of SME bias of HBR validation

December 2003 – Complete studies of SME bias of HBR validation

April 2004 – Dissertation defense

June 2004 – Technical report submitted to DMSO

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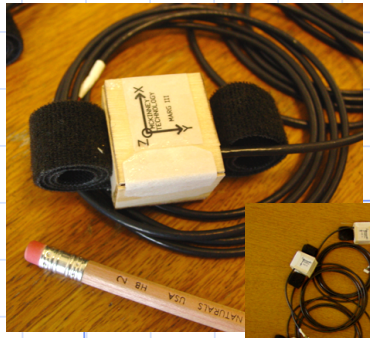
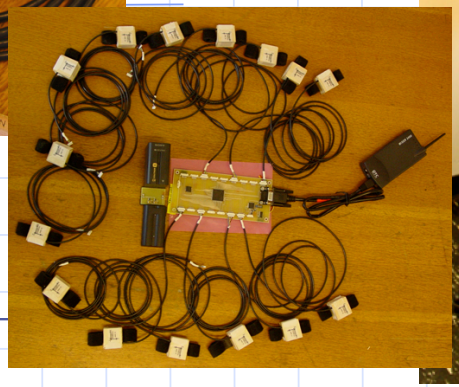
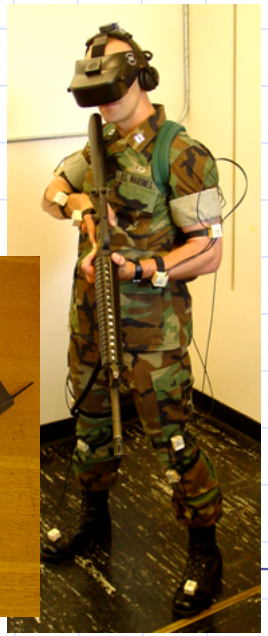
Immersive Technologies

In immersive technologies, we have designed a source-less tracker that can be manufactured wrist-watch size, and have performed considerable work on the deployment of sound to enhance the feeling of immersion.







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Full Body Tracking Using Inertial/Magnetic Sensors
Sponsor - N6M, USARO
PIs –Xiaoping Yun, Eric Bachmann
Goal – Develop a full body tracking system based upon the use of small inertial/magnetic sensor modules. Posture tracking portion of the system will be completely "sourceless." Avatar will be positioned by tracking a single point.

Deliverables

Quaternion-based filter developed to estimate the orientation of a rigid body. Avoids singularities in orientation representation and is able to continuously correct for drift without the need for still periods.

Recently Published Papers:

- *2003 IEEE International Conference on Robotics and Automation* (ICRA 2003)
- *IEEE International Symposium on Computational Intelligence in Robotics and Automation* (CIRA 2003)
- *IEEE/RSJ International Conference on Robot and Intelligent Systems* (IROS 2003)

Student Research:

Alex Mabini, Faruk Yildiz, Eric Montgomery, Christopher Peterson, Andreas K. Kavousanakis, Ioannis Saliaris

Milestones

August 2003 - Third generation of the MARG digital sensor module (MARG III) design and fabrication completed. MARG III sensors measure 3.3x3.0x2.1 cm. Custom-designed Communication Interface Unit (CIU) developed and built. Performs three functions: (1) accepts inputs from up to 16 MARG III sensors; (2) provides power to the sensors connected to it; and (3) packages sensor data and wirelessly transmits tracking data to a server.

Summer 2004 – Prototype wireless full body tracking system to be completed. System will incorporate an inexpensive optical position for indoor use.

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Combat Modeling & Analysis

We are creating a Center for Combat Modeling & Analysis, working the Navy Simulation System, & working with NETWARCOM to design a Virtual FORCEnet.

Mission for Combat Modeling & Analysis Focus

To breathe new life into Navy modeling & simulation with the integration of cutting-edge MOVES technologies & analysis.

E.g. XML, agent based modeling, visualization & presentation,knowledge-based decision making,... All the MOVES technologies.

Enabling the operator to make better decisions.

Combat Modeling and Analysis Center

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Unique Capabilities

A diverse group of faculty and students from different services and different nations working together in an academic environment.

A learning environment of non-attribution will facilitate the unrestrained exploration of new initiatives and the distribution of relevant insights.

Key Objectives

Create a research center that emphasizes combat modeling, simulation, wargaming, and analysis in support of strategic, operational, and tactical decision making and experimentation.

Converge experts in combat modeling, simulation, wargaming, analysis and the art of war to explore transformational initiatives and give insights to war-fighters.

Provide expertise to evaluate and improve current models and help develop emerging combat models.

Promote the understanding of the foundational role that combat modeling plays in the decision making process for the design and development of new systems.

Partners

TRADOC Analysis Center – Monterey (TRAC-MTRY)
Lawrence Livermore National Lab (LLNL)
Sandia National Lab
Joint Forces Command (JFCOM)

Ongoing research activity

Collaborative effort with LLNL on use and improvement of JCATS in support of wargaming and analysis.

NSS Configuration Management Project. CRADA with Boeing. Two thesis students.

Collaborative effort with BAE/JFCOM for the development of CONOPS for Adaptive Joint C4ISR node. Two thesis students.

Collaborative effort with TRAC-MTRY on Master TRADOC problem. Thesis students TBD.

Defense & Entertainment Collaboration

In defense/entertainment collaboration, we have Transformed Army recruiting by constructing a PC game that provides the experience of a potential career in the Army. We have researched the ability for computing player aptitude from game play. We have fielded the fastest growing online PC game of all time from inside of our institute, a game that has been the recipient of several “best game” or “runner up for best game” of the year awards.

America's Army Status

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As of November 2003

- Total registered users = 2,249,251
- Total completed basic training = 1,414,718
- Total missions played = 250M+

October 2002 - IGN Awards

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IGN.COM EDITORS' CHOICE AWARDS

The IGN Editors' Choice Award is a sign of excellence reserved for only the best products. The award signifies excellence in entertainment value, performance, design, originality, and lasting appeal. A product bearing this award has our unequivocal recommendation and is sure to become a classic in its field.

game title	genre		rating
NHL 2003	Sports	Buy Now	8.8
No One Lives Forever 2	First-Person Shooter	Buy Now	9.0
Unreal Tournament 2003	First-Person Shooter	Buy Now	9.0
America's Army	First-Person Shooter		8.8
Battlefield 1942	First-Person Action	Buy Now	9.3
Emperor: Rise of the Middle Kingdom	Strategy Simulation	Buy Now	8.8
The Thing	Action Adventure	Buy Now	8.5
Icewind Dale II	RPG	Buy Now	9.0
Mafia	Third-Person Action	Buy Now	9.2
Medieval: Total War	Strategy	Buy Now	8.9
Madden NFL 2003	Sports	Buy Now	9.2
Warcraft III: Reign of Chaos	Real-Time Strategy	Buy Now	9.3
Shadow of Destiny	Adventure		8.7
Age of Wonders 2: The Wizard's Throne	Strategy	Buy Now	8.5
Neverwinter Nights	RPG Online	Buy Now	9.0
2002 FIFA World Cup	Sports	Buy Now	9.3
The Sum of All Fears	First-Person Shooter	Buy Now	8.7
Grand Theft Auto III	Action	Buy Now	9.4
Baseball Mogul 2003	Sports Simulation	Buy Now	8.9
Soldier of Fortune II: Double Helix	First-Person Shooter	Buy Now	8.8


THE OFFICIAL U.S
GAME
COMPUTER GAMING WORLD
EDITORS' CHOICE
2002 action vault AWARD
ign vault
TEEN
T
CONTENT RATED BY ESRB
EMPOWER YOURSELF
DEFEND FREEDOM
U.S.ARMY

Academy of Interactive Arts & Sciences

Finalists for 2003's PC First Person Action Game of the Year include:

No One Lives Forever 2: A Spy in H.A.R.M.'s Way, published by Sierra Entertainment, developed by Monolith;

Medal of Honor: Allied Assault, published by Electronic Arts, developed by 2015 Inc.;

America's Army, published and developed by the US Army.

Award ceremony in Las Vegas 27 Feb 2003 at the Academy of Interactive Arts & Sciences DICE conference.


See a sound, hear a sound
D.I.C.E. SUMMIT 2003
DICE


D.I.C.E. SUMMIT 200
DICE


INNOVATION AWARDS
INNOVATION
IN PC GAMING

America's Army at E3 2003

- Special Forces
- Stryker
- Medic Training
- E3 Demonstration


ELECTRONIC ENTERTAINMENT EXPO
THE OFFICIAL U.S. ARMY GAME
AMERICA'S ARMY
MCV
NEWS MEDIA
On Assignment!


AMERICA'S ARMY
SPECIAL FORCES
AMERICA'S
EMPOWER YOURSELF


U.S. ARMY


AMERICA'S ARMY
SPECIAL FORCES
EXIT


THE OFFICIAL U.S. ARMY GAME
AMERICA'S ARMY
EMPOWER YOURSELF DEFEND FREEDOM.


THE OFFICIAL U.S. ARMY GAME
AMERICA'S ARMY
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GAMES

'America's Army' Is Big Hit, And Not Just With Civilians

Realistic Videogame Is Used In Training for Army Cadets

By PETER ROTH
THE WALL STREET JOURNAL ONLINE

WEST POINT, N.Y. -- Here at the U.S. Military Academy, future military officers are clicking their way through the fog of war.

Under camouflage netting and warm red lights in the computer lab at the War Fighting Simulation Center, cadets can go through everything from basic training to simulated combat situations.

The secret weapon: "America's Army: Operations." The videogame, developed as a recruiting tool to connect with civilian teenagers over the Internet, has also grown into a valuable resource for training future officers for battle.

The game is the brainchild of Col. Casey Wardynski, the director of the Army's Office of Economic and Manpower Assessment. The project began during a recruiting slump in the late 1990s. With its realistic graphics and

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Summary Period: Last 12 Months
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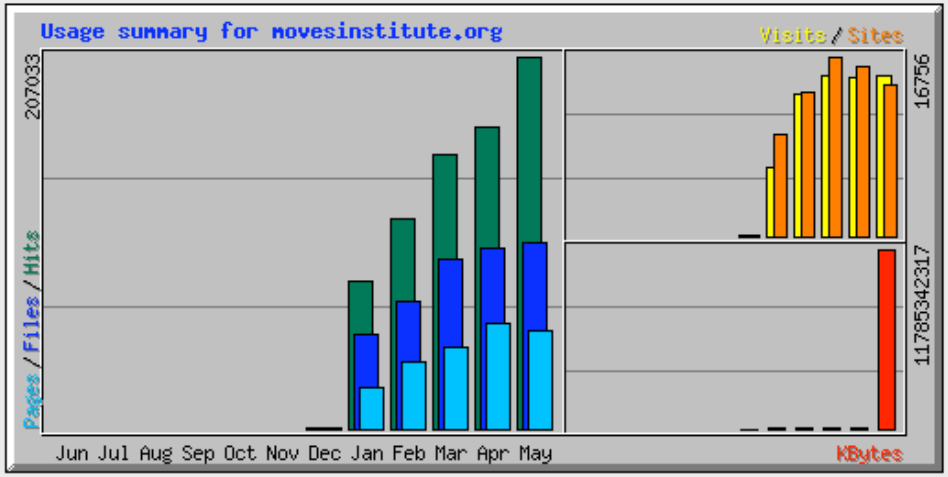
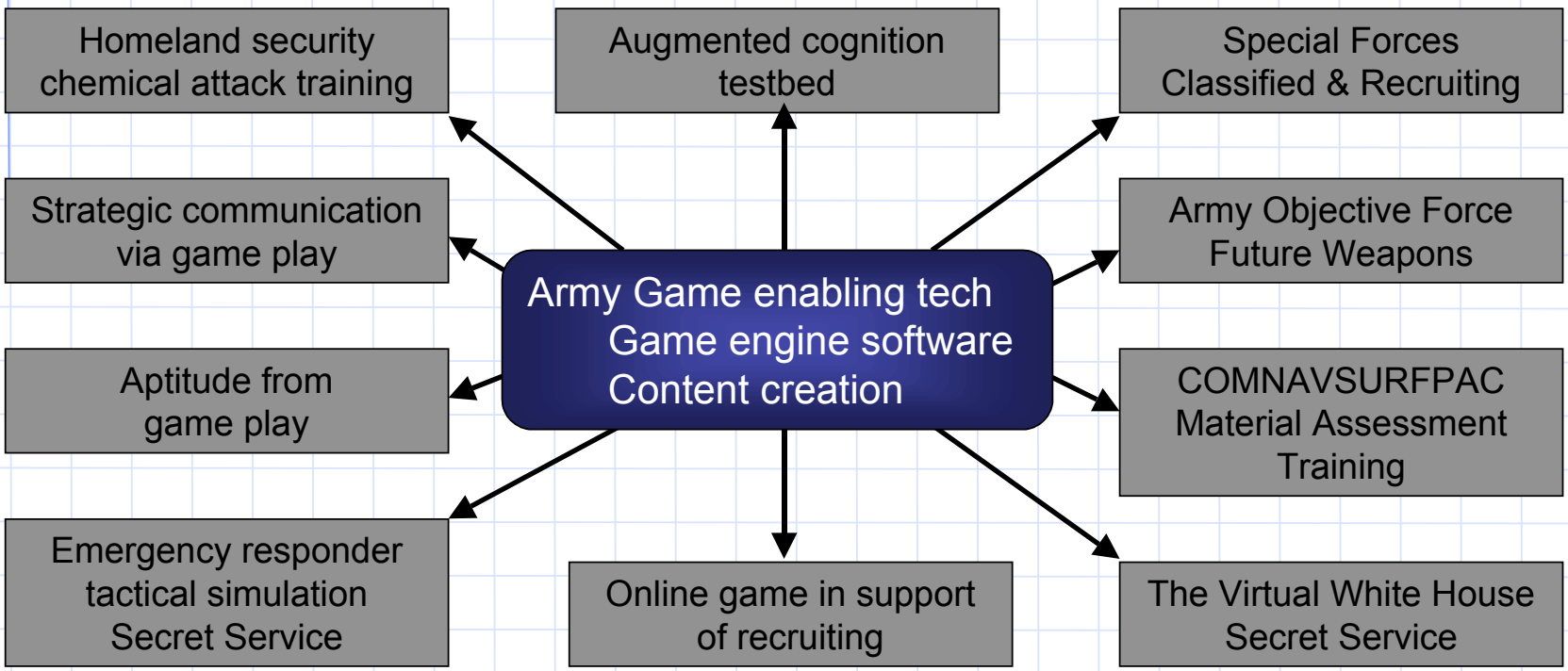


Summary by Month

Month	Daily Avg				Monthly Totals					
	Hits	Files	Pages	Visits	Sites	KBytes	Visits	Pages	Files	Hits
May 2003	7139	3558	1882	517	14040	11785342317	15014	54603	103199	207033
Apr 2003	5596	3334	1940	494	15743	94148112	14849	58208	100044	167889
Mar 2003	4930	3026	1463	479	16756	66830746	14878	45382	93828	152839
Feb 2003	4175	2548	1345	472	13442	52760986	13239	37660	71351	116914
Jan 2003	2737	1739	777	216	9514	27712599	6483	23333	52180	82121
Dec 2002	27	6	13	1	23	334	23	171	88	359
Totals						12026795095	64486	219357	420690	727155

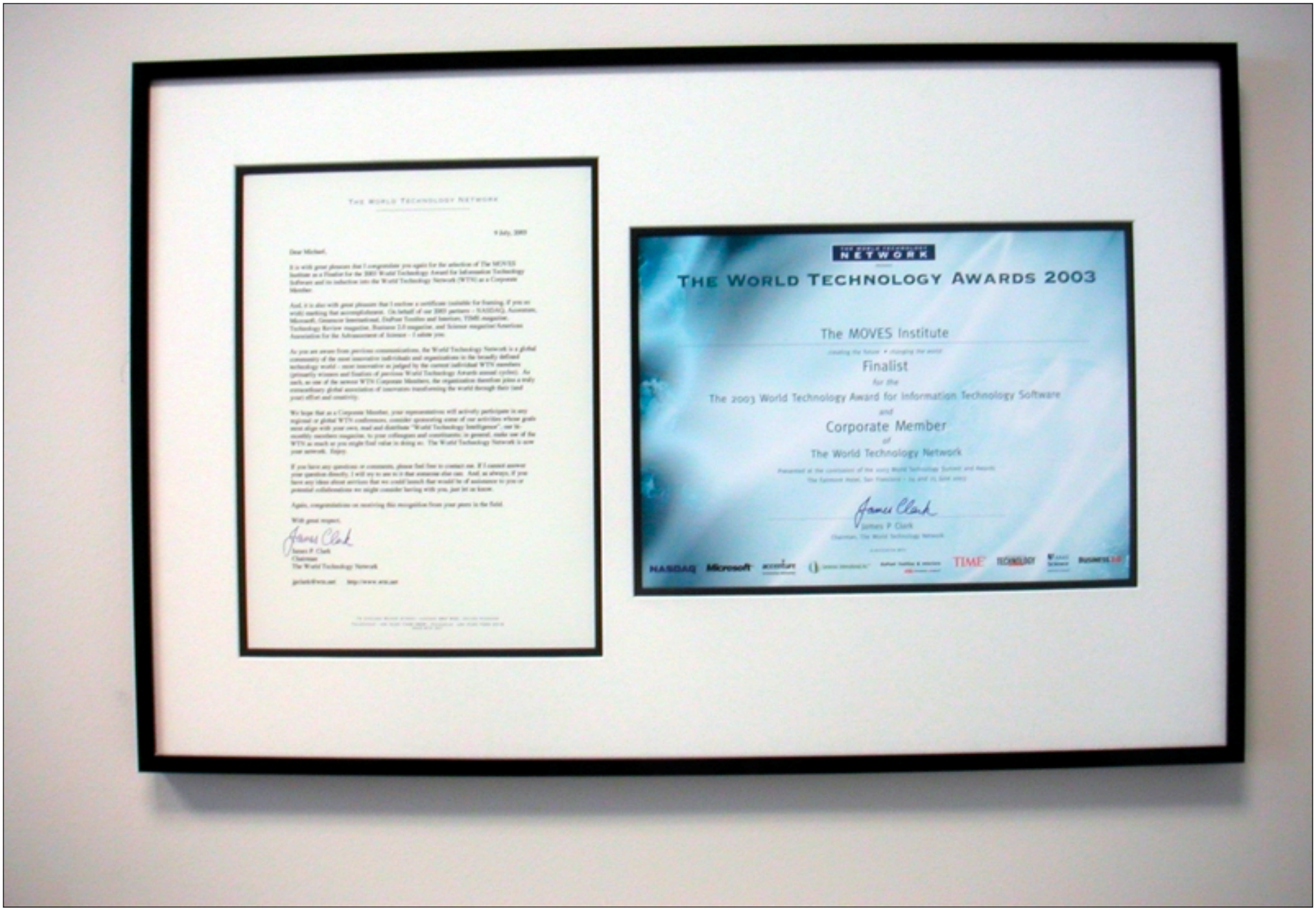
MOVES
Naval Postgraduate School

Spin-offs



Final Note


THE WORLD TECHNOLOGY AWARDS 2003
IT SOFTWARE (CORPORATE)
WINNER
Sony Corporation
FINALISTS
IBM Corporation
Lieto Software GmbH
The MOVIES Institute
LTU Technologies



THE WORLD TECHNOLOGY NETWORK

9 July, 2003

Dear Michael,

It is with great pleasure that I congratulate you again for the selection of The MOVES Institute as a Finalist for the 2003 World Technology Award for Information Technology Software and its induction into the World Technology Network (WTN) as a Corporate Member.

And, it is also with great pleasure that I enclose a certificate (suitable for framing, if you so wish) marking that accomplishment. On behalf of our 2003 partners – NASDAQ, Accenture, Microsoft, Genencor International, DuPont Textiles and Interiors, TIME magazine, Technology Review magazine, Business 2.0 magazine, and Science magazine/American Association for the Advancement of Science – I salute you.

As you are aware from previous communications, the World Technology Network is a global community of the most innovative individuals and organizations in the broadly defined technology world – most innovative as judged by the current individual WTN members (primarily winners and finalists of previous World Technology Awards annual cycles). As such, as one of the serious WTN Corporate Members, the organization therefore joins a truly extraordinary global association of innovators transforming the world through their (and your) effort and creativity.

We hope that as a Corporate Member, your representatives will actively participate in any regional or global WTN conferences, consider sponsoring some of our activities whose goals most align with your own, read and distribute "World Technology Intelligence", our bi-monthly members magazine, to your colleagues and constituents, in general, make use of the WTN as much as you might find value in doing so. The World Technology Network is now your network. Enjoy.

If you have any questions or comments, please feel free to contact me. If I cannot answer your question directly, I will try to see to it that someone else can. And, as always, if you have any ideas about services that we could launch that would be of assistance to you or potential collaborations we might consider having with you, just let us know.

Again, congratulations on receiving this recognition from your peers in the field.

With great respect,

James P. Clark
Chairman
The World Technology Network

jpclark@wtn.net http://www.wtn.net

NETWORK

THE WORLD TECHNOLOGY AWARDS 2003

The MOVES Institute

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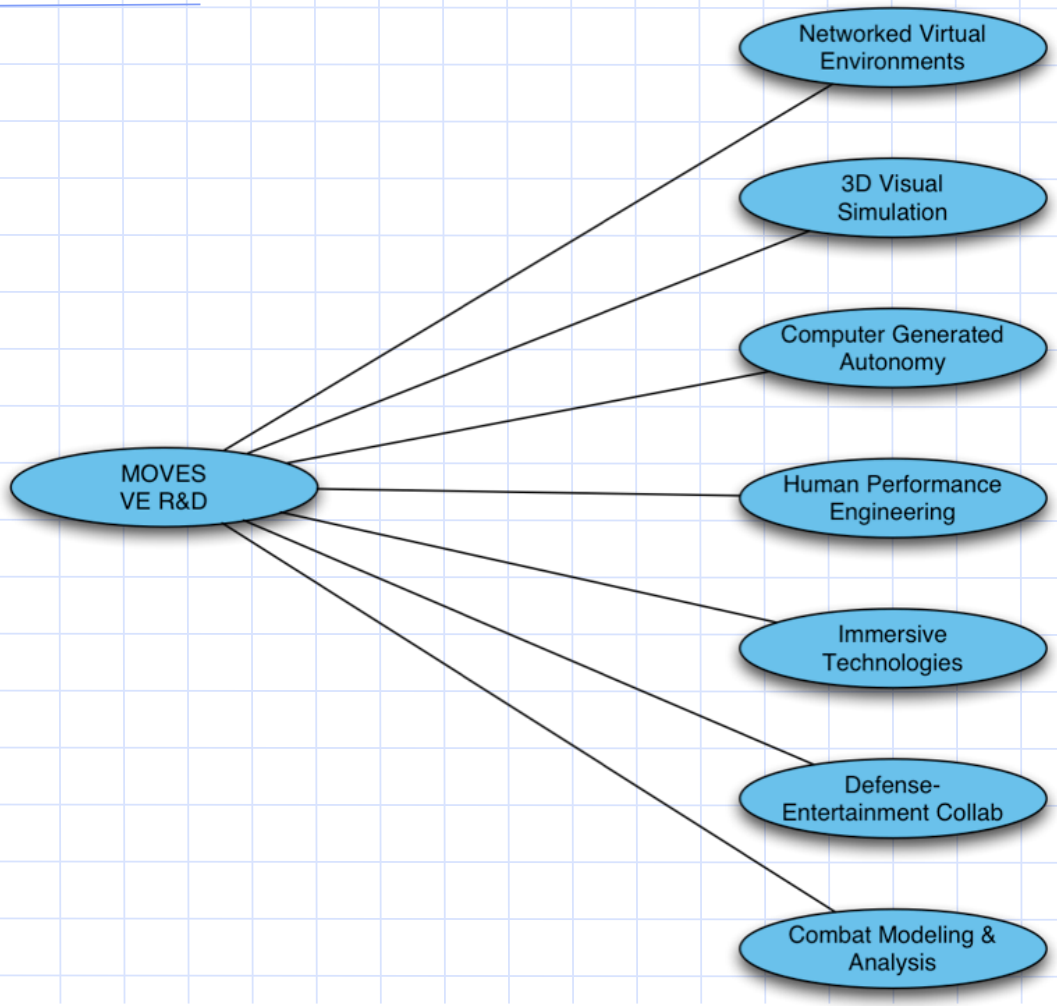
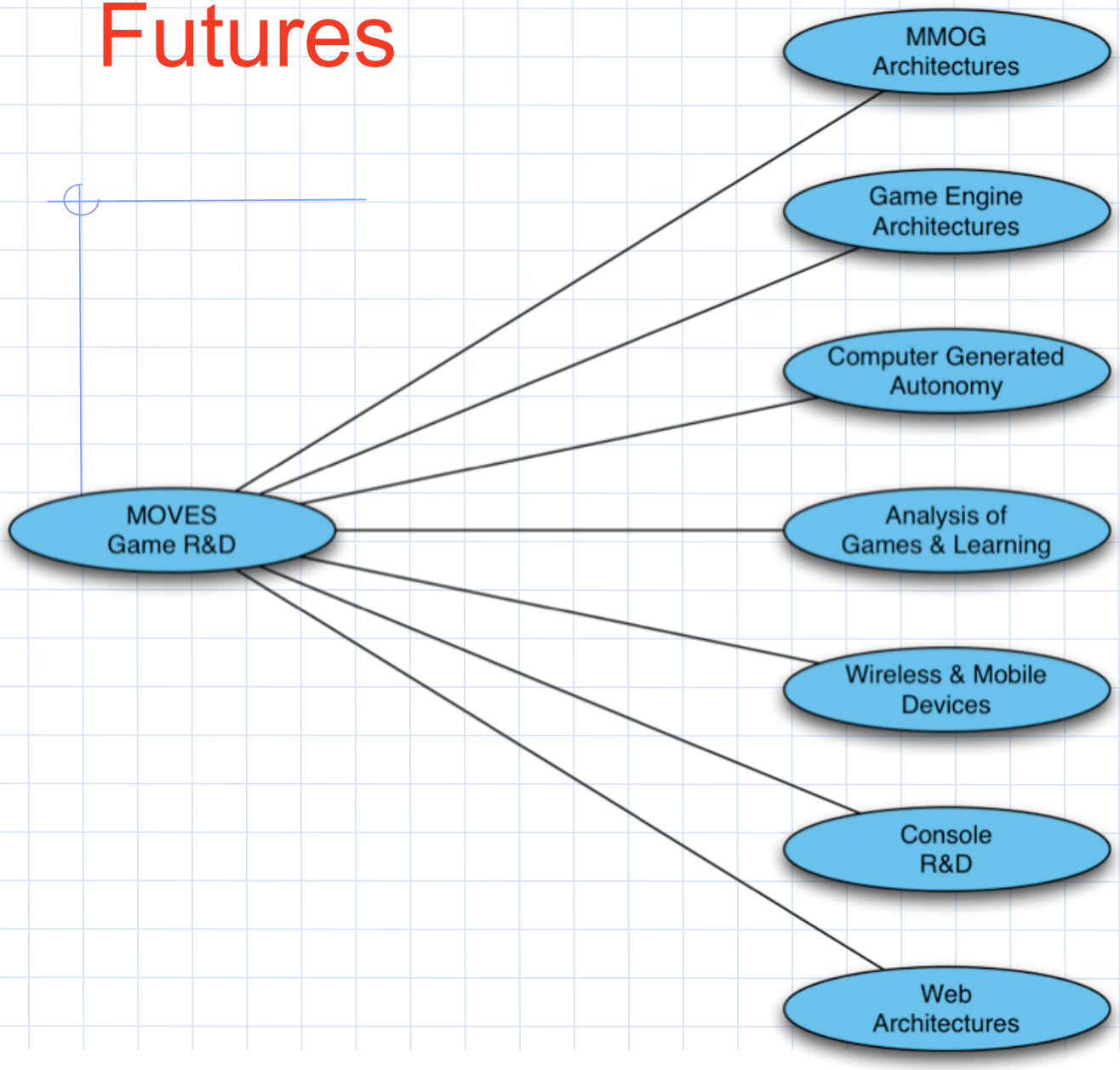
James P. Clark
Chairman, The World Technology Network

NASDAQ Microsoft accenture TIME TECHNOLOGY

Where we are today



Futures



MOVES
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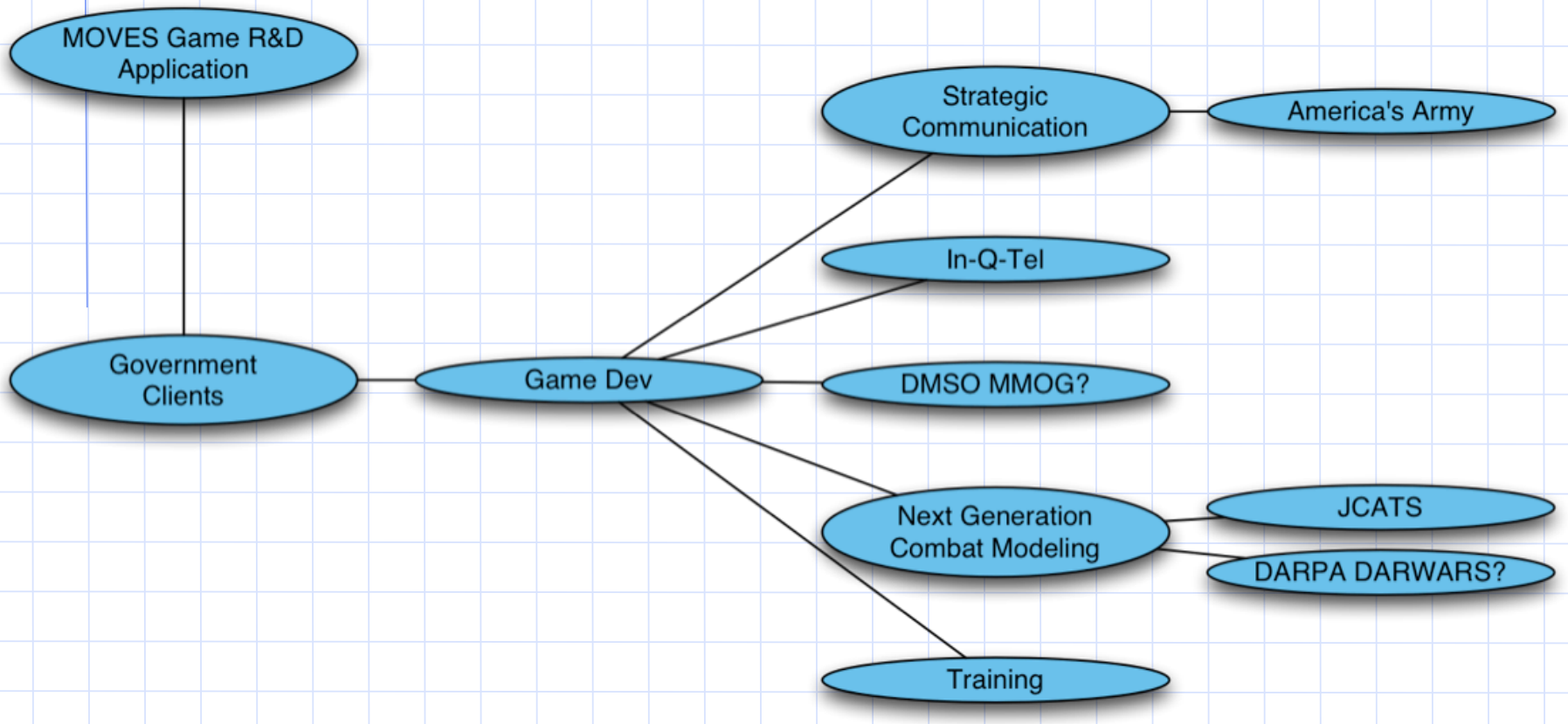
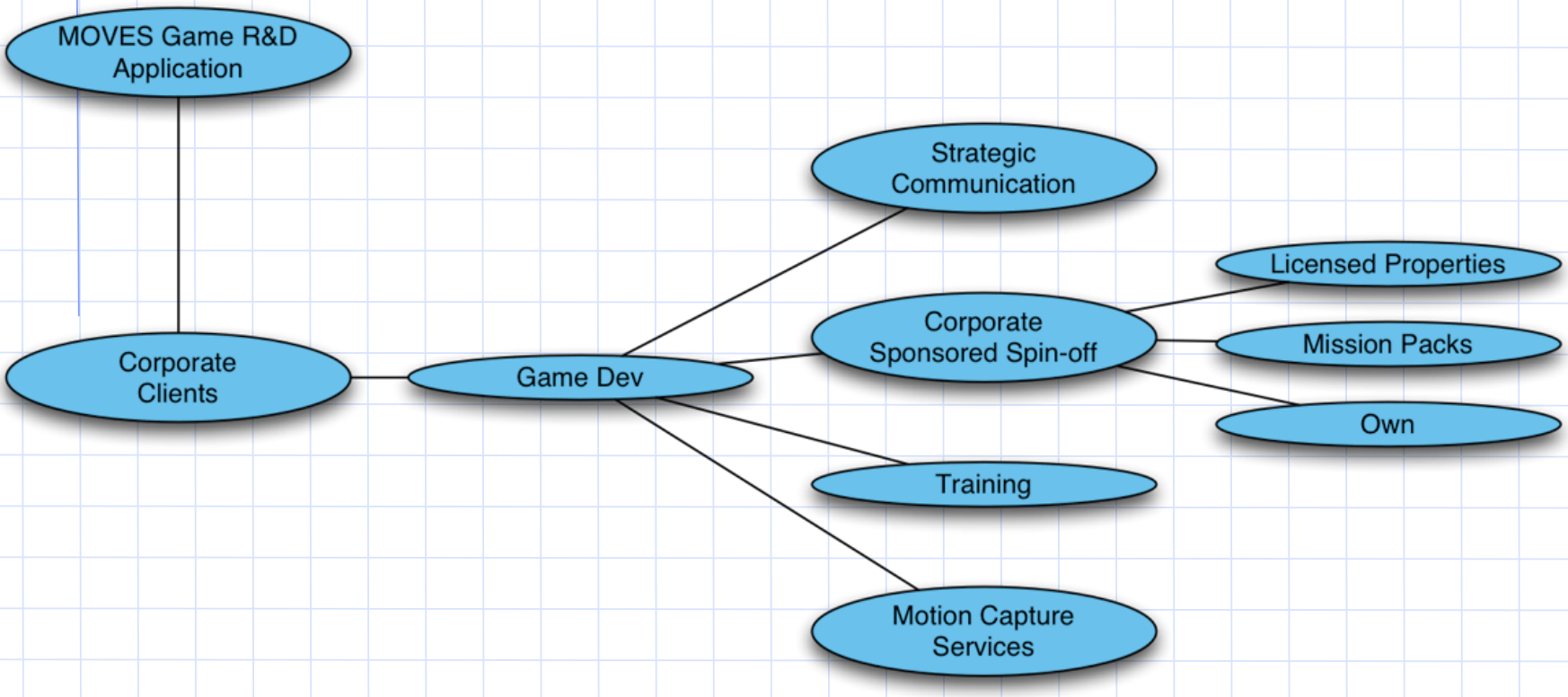
Futures


MOVES Game R&D Application
Government Clients
Game Dev
Strategic Communication
America's Army
In-Q-Tel
DMSO MMOG?
Next Generation Combat Modeling
JCATS
DARPA DARWARS?
Training

Futures


MOVES Game R&D Application
Corporate Clients
Game Dev
Strategic Communication
Corporate Sponsored Spin-off
Licensed Properties
Mission Packs
Own
Training
Motion Capture Services

Questions?